

HONOLULU RAPID TRANSIT
DEVELOPMENT PROGRAM

TASK 4.1.1.1
CONCEPTUAL DEFINITION
OF ALTERNATIVES

Department of Transportation Services
City and County of Honolulu

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1. Introduction

Over the last twenty years there have been numerous proposals for building a rapid transit system in Honolulu. Many millions of dollars have been spent analyzing many different rapid transit alternatives. The purpose of this Conceptual Definition of Alternatives is to briefly review existing studies and identify a priority corridor and promising alternatives for further refinement and evaluation in Conceptual Engineering.

The collection of reports and planning documents on transit alternatives issued over the past two decades is voluminous and includes Federally approved plans for a grade-separated system known as HART (Honolulu Area Rapid Transit). All studies point to a continued worsening of congestion in the single corridor from Ewa to Hawaii Kai, and that solutions without grade separation (street cars, light-rail, etc.) have very limited potential for improving travel times. They also suggest that any grade-separated solution will have high capital costs, which may or may not be justified by other savings and benefits.

Traffic congestion is now severe throughout the corridor and is perceived as a major public problem. Bus ridership has grown substantially since the City acquired the system in the early 1970s, to the point where Honolulu has among the highest per-capita transit use of any metropolitan area in America. A high "base" ridership for rapid transit or bus alternatives is no longer speculation, but is a daily reality.

The interruption of rapid transit planning caused by the cancellation of the HART system in 1981 may prove beneficial in the long run. Evolution in rapid transit technology, implementation methods, and financing have made possible reduced capital and operating costs and improved service efficiency. It may be possible to build a system that will cost less than HART to build and operate, provide superior service, fit better into Honolulu's unique environment, and yield greater benefits to the community at large.

The urban freeway system is virtually complete, and the City is now implementing most of the remaining "Transportation System Management" (TSM) measures. There is also renewed interest in para-transit alternatives, such as private mini-bus service or vanpools, as a lower cost alternative or supplement to rapid transit.

This report defines three alternative approaches for dealing with Honolulu's growing transportation needs in the priority corridor from the Waipahu and Pearl City area to the University and Waikiki.

First, a No-Build alternative is defined including all currently committed highway improvements and traffic management programs. The No-Build alternative assumes continuation of existing policies to expand the existing bus system as required to serve ridership growth and new suburbs, at current service standards.

Second, a Transportation System Management (TSM) alternative is defined which includes all of the "No-Build" improvements plus completion of the HOV system from Ewa and Hawaii Kai to the downtown core. Currently HOV lanes run from Pearl City to Middle Street, and from Aina Koa to Kirkwood in Aina Haina.

Third, a Rapid Transit-Coordinated Bus alternative will be defined for one or more promising alignments through the corridor. Various alignments, station locations, and system lengths will be evaluated for cost-effectiveness and environmental acceptability.

All three alternatives, the No-Build, TSM, and Rapid Transit-Coordinated Bus, will be further defined and evaluated in conceptual engineering.

Note that the Conceptual Definition of Alternatives is based substantially on more detailed analysis presented in the Alternatives Analysis Update, Rapid Transit Task 4.1.1. Please refer to it for further back-up information.

2. History of Rapid Transit Planning in Honolulu

Since the early-1970s, Honolulu has spent millions of dollars on evaluating alternative rapid transit system designs. This section briefly reviews the seven major studies, illustrating the extent to which effort and resources have already been invested in analyzing transit system alternatives. All major studies have come to essentially the same conclusion, that grade-separated rapid transit is the only capital-intensive system that could provide Honolulu with improved transportation at potentially reasonable cost. Previous studies have not, however, proved to everyone's satisfaction that rapid transit itself is a cost-effective solution, compared with simply maintaining existing policies and improving the bus system, or implementing further Transportation System Management (TSM) measures and promoting paratransit services.

2.1 The Oahu Transportation Study

The Oahu Transportation Study (OTS), completed in 1967 by a joint city-state task force, predicted that roads and freeways would be severely congested by 1985, and that a Rapid Transit System would be required. Two alternatives were examined: (1) an all-bus system operating in mixed traffic over an expanded freeway system, and, (2) a fixed guideway system with the completion of only committed highway improvements. The OTS report concluded that the rapid transit was cost effective when compared to an all-bus system due to the reduced need for additional highway improvements and other social, economic, environmental and community benefits which the all-bus system could not match. The OTS did not contain a detailed route plan, but suggested a system that would extend from Wahiawa and Ewa to Hawaii Kai, including a loop across the windward side.

2.2 Preliminary Engineering and Evaluation Program - Phase I (PEEP I)

Based on needs identified in OTS, and using newly available Federal funding, the City began in 1971 to plan a rapid transit system under the Preliminary Engineering and Evaluation Program (PEEP I). By this time, the City and County of Honolulu had initiated the acquisition and consolidation of three independent bus companies. Under the PEEP I planning process, a wide range of alternatives and modes were considered including: line-haul fixed guideway with feeder buses, bus-on-busway, and waterborne systems. Numerous corridors, route lengths and alignments were closely examined. The PEEP I study concluded that a grade separated, rubber tired, mostly elevated rapid transit line, extending from Hawaii Kai to Pearl City would best meet the long-range transportation needs of the island.

2.3 Alternative Transportation Systems Study

In 1973, the City and State briefly examined "Personal Rapid Transit" (PRT). The idea, popular at the time, was to use aerospace technology to move people around cities. PRT promised to move people quietly, quickly, and automatically around the city on a network of elevated tracks or monorails. The PRT plan called for several dozen stations, and passenger "cabins" which would work like automatic elevators carrying passengers non-stop to their destination. The City concluded that such a system, if it could work, required several years of technical development.

2.4 Preliminary Engineering and Evaluation Program - Phase II (PEEP II)

Although a consensus was forming among City and State officials, the State Legislature and City Council to implement a 14-mile rapid transit system, new Federal Regulations required a more formal evaluation of alternatives. From 1974 to 1975, "PEEP II" (Preliminary Engineering and Evaluation Program - Phase II) formally reconsidered a wide range of alternative modes including "light rail", elevated busways, and waterborne commuting systems. Another important function of PEEP II was to summarize into one document all past planning studies related to a fixed guideway system. PEEP II again rejected all but rapid transit as either ineffective or too expensive. Although PEEP II abandoned rubber tires for conventional steel wheels, the system was generally similar to the PEEP I design. The system eventually became known as HART, for Honolulu Area Rapid Transit.

In spite of the numerous studies which pointed to the need for a fixed guideway solution, many people still questioned the costs and benefits of implementing rapid transit at that time.

2.5 The Draft Environmental Impact Statement (DEIS)

UMTA gave approval to the HART concept, and agreed to fund preparation of a Draft Environmental Impact Statement (DEIS). Issued in 1979, it compared various lengths of the HART system with all-bus and "Light Rail" alternatives. After formal public hearings, and anticipating that the Federal government would fund most of the capital costs, the City Council approved the Final Environmental Impact Statement for an initial 8-mile HART system running from the University of Hawaii to the Airport.

2.6 Final Environmental Impact Statement (FEIS)

A Final Environmental Impact Statement (FEIS) was prepared and issued in 1982. It considered the following alternatives:

- a. Baseline Bus ("no-build") System;
- b. TSM/Expanded Bus System;
- c. Busway;
- d. Light Rail Rapid Transit; and
- e. Fixed Guideway Rapid Transit.

A set of other alternatives (streetcars, trolley buses, downtown people movers, waterborne systems, etc.) were considered, but dismissed in favor of the other alternatives. The alternatives were divided into two groups for evaluation -- low capital cost and high capital cost systems. The Expanded Bus System (non-grade separated) and Fixed Guideway Rapid Transit (grade separated) emerged as the two best alternatives within their respective groups. It was determined that by 1990, Fixed Guideway Rapid Transit would have higher ridership and lower operating costs than the TSM/Expanded Bus System.

Nevertheless, concerns about the system's cost and economic viability had again surfaced. In particular ridership estimates were questioned. The project was put "on hold", and alternatives such as "light rail" and express buses were again discussed.

2.7 The HALI 2000 Study

With the original Oahu Transportation Study almost 20 years old, in 1983 and 1984 the Oahu Metropolitan Planning Organization (OMPO) conducted a full-scale review of the island's long range travel needs. Making use of more complex computer modelling methods, the Hali 2000 program estimated regional travel demand for alternative systems including the HART system, High Occupancy Vehicle (HOV) or "diamond" lanes, a controversial system of road user tolls, and both at-grade and elevated "light rail".

Hali 2000 did not recommend a particular system. However, although it forecast somewhat lower rapid transit ridership than PEEP I or II, it confirmed that at-grade light rail and bus-only systems could not reduce congestion or provide faster trips.

3. Conceptual Definition of Alternatives

Before Honolulu decides whether to implement rapid transit, three types of alternatives need to be evaluated. First, the No-Build alternative will be considered as a baseline, assuming no rapid transit construction and continuation of existing explicit and de-facto policies. Second, TSM strategies must be considered, to determine to what extent they can offer a reasonable and less expensive alternative to rapid transit. Third, alternative rapid transit system lengths and alignments must be considered, to determine both the most efficient system length and the minimum operable segment.

3.1 No-Build Alternative Definition

The No-Build alternative is intended as a baseline for comparison with other alternatives. It assumes continuation of current plans and policies, and will include all existing and committed improvements expected to be in place by the year 2005. This will include:

3.1.1 Highway System Improvements (only major projects listed)

- 1.1 Construction of the H-3 Freeway from Halawa to Kaneohe
- 1.2 Completion of the H-1 HOV System from Makakilo to Kahala, including reconstruction of the Lunalilo Freeway to Interstate Standards;
- 1.3 Widening of Kamehameha Highway from Waiawa to Mililani;
- 1.4 Widening of Farrington Highway to four lanes from Waipahu to Kapolei;
- 1.5 Implementation of traffic signal computerization throughout the corridor from Waipahu to Kahala;

3.1.2 Bus System Improvements (only major projects listed)

- 2.1 Completion of the Hotel Street Bus Mall;
- 2.2 Installation of two-way radios on all buses, with a real-time automated vehicle monitoring system;
- 2.3 Completion of planned new bus maintenance and storage facilities at Halawa and Alapai;
- 2.4 Construction of park-and-ride lots with support facilities in Hawaii Kai (under construction), Waikele/Waipahu (site identified), West Loch (site identified), Mililani (site identified), and Windward Oahu;

- 2.5 Continued expansion of the bus system and fleet growth to carry future ridership, and to extend service into new suburbs, at existing service levels; and
- 2.6 Installation of computerized scheduling systems and management information systems.

3.2 TSM Alternative Definition

The TSM alternative is intended to reflect the best transportation performance that can be obtained without additional, major capital intensive improvements. The completion of the H-1 HOV lane system, and renewed private interest in operating commuter minibuses, opens new possibilities for an efficient "TSM" alternative. Besides all of the committed improvements included in the "No-Build" alternative, the TSM alternative will include:

3.2.1 A Continuous Priority Bus Route Through Downtown.

This will link existing HOV lanes into a continuous system penetrating the center of Honolulu. The major elements of this system would include:

- 1.1 The planned HOV lanes on Interstate H-1 from Makakilo to Waipahu;
- 1.2 The existing HOV lanes on Interstate H-1 from Waipahu to Halawa;
- 1.3 The existing HOV lanes on Interstate H-1 from Halawa to Middle Street, or the existing HOV lanes on the Moanalua Road Freeway;
- 1.4 The proposed elevated HOV way above Nimitz Highway, or new exclusive lanes along Dillingham Boulevard;
- 1.5 The proposed HOV lanes on Interstate H-1 from Middle Street to Kapiolani Blvd.;
- 1.6 Signal and intersection modifications to connect the Nimitz or Dillingham HOV lanes to the Hotel Street Bus Mall;
- 1.7 The existing Hotel Street Bus Mall, from River Street to Punchbowl Street, supplemented by the King/Beretania couplet;
- 1.8 New exclusive bus lanes on King and Beretania Streets from Punchbowl street to Interstate H-1 at Kapiolani Blvd;

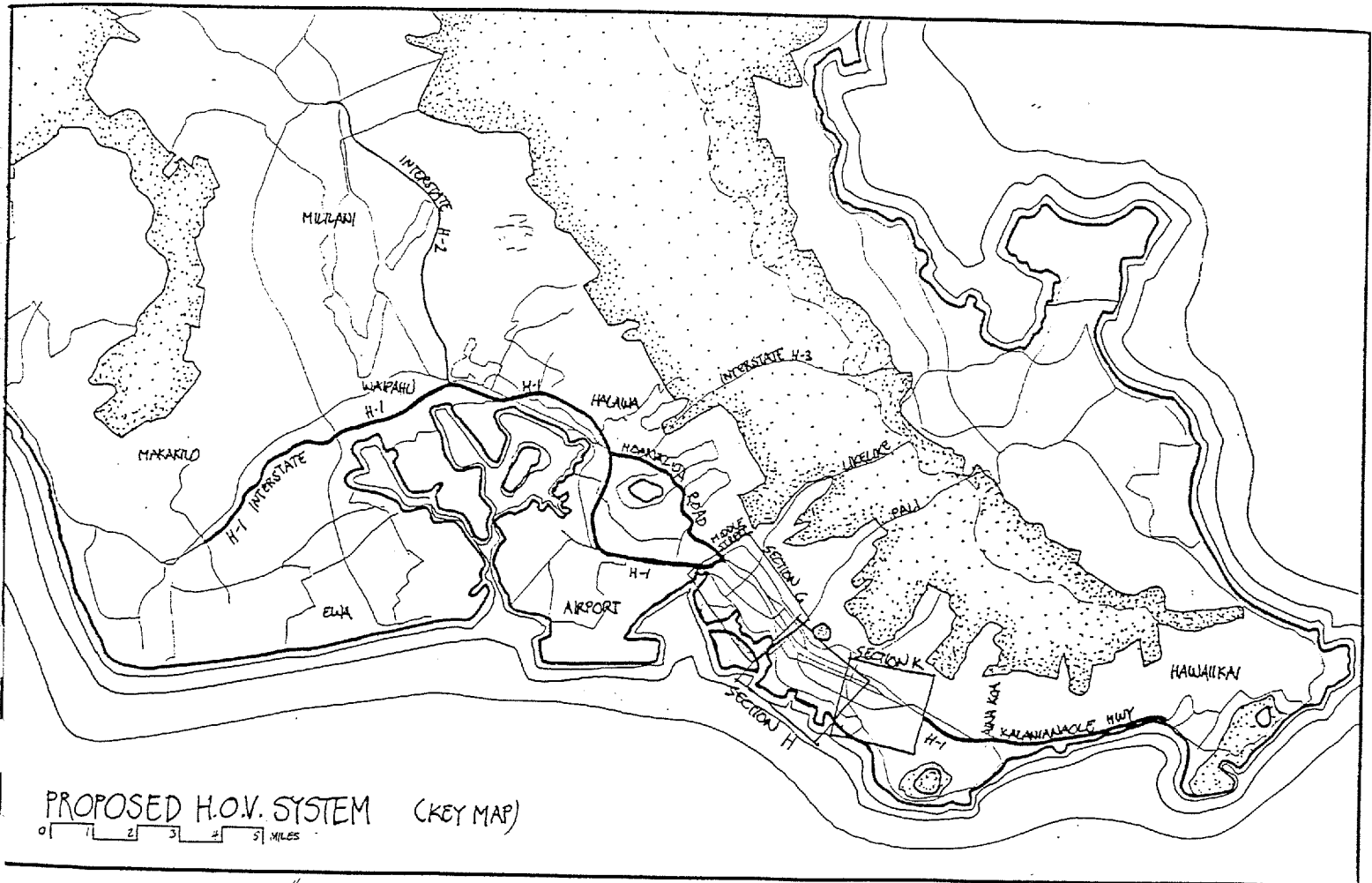
1.9 The proposed HOV lanes on Interstate H-1 from Kapiolani to Aina Koa Street;

1.10 The proposed two-lane, partially depressed HOV roadway from Aina Koa Street to Hawaii Kai;

See Map 1-1 through 1-4 for description of the existing and proposed HOV lanes.

Map 1-1 Proposed HOV System

Key Map



Section G - Kalihi

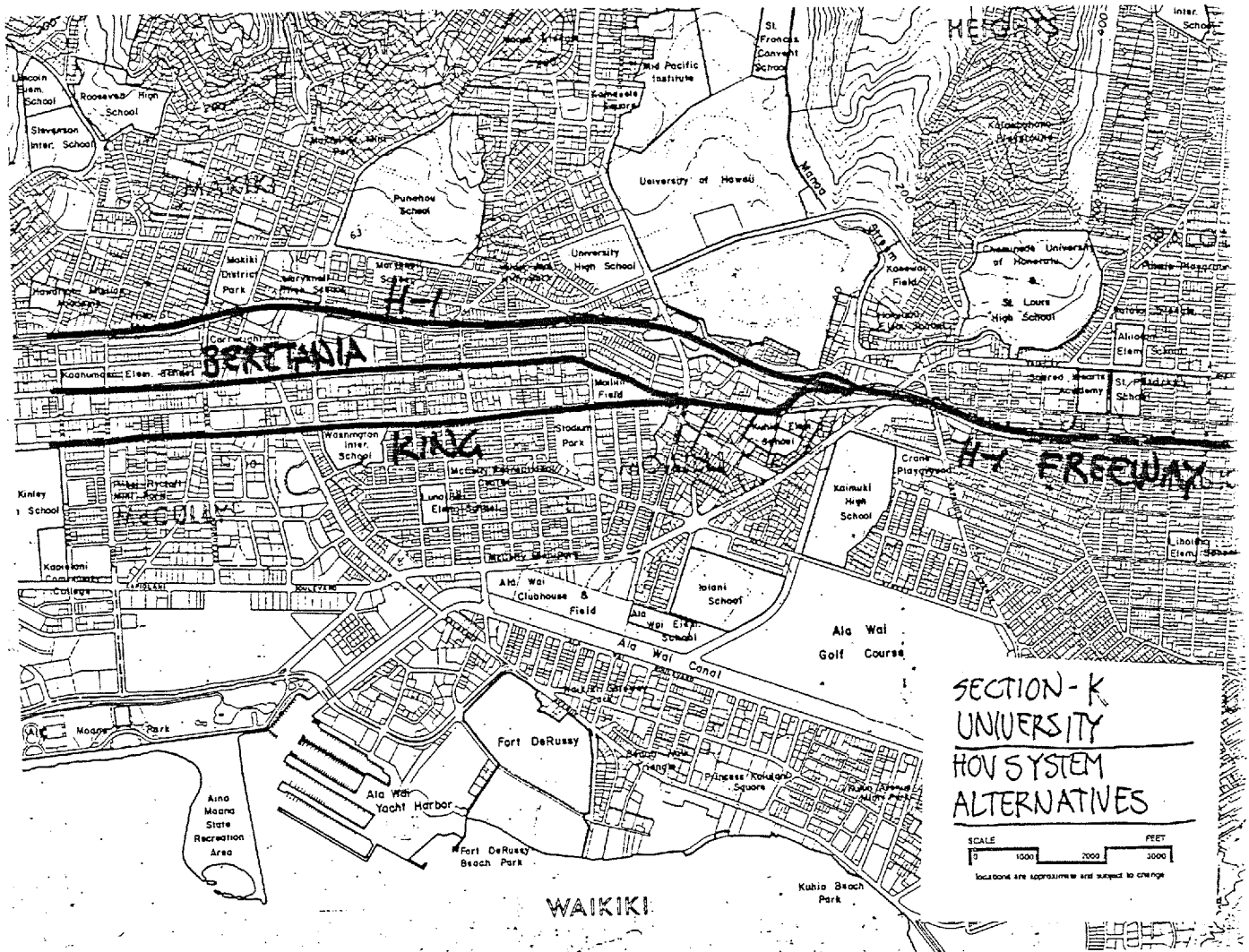


Section H - Downtown/Kaka'ako



Map 1-4 Proposed HOV System

Section K - University

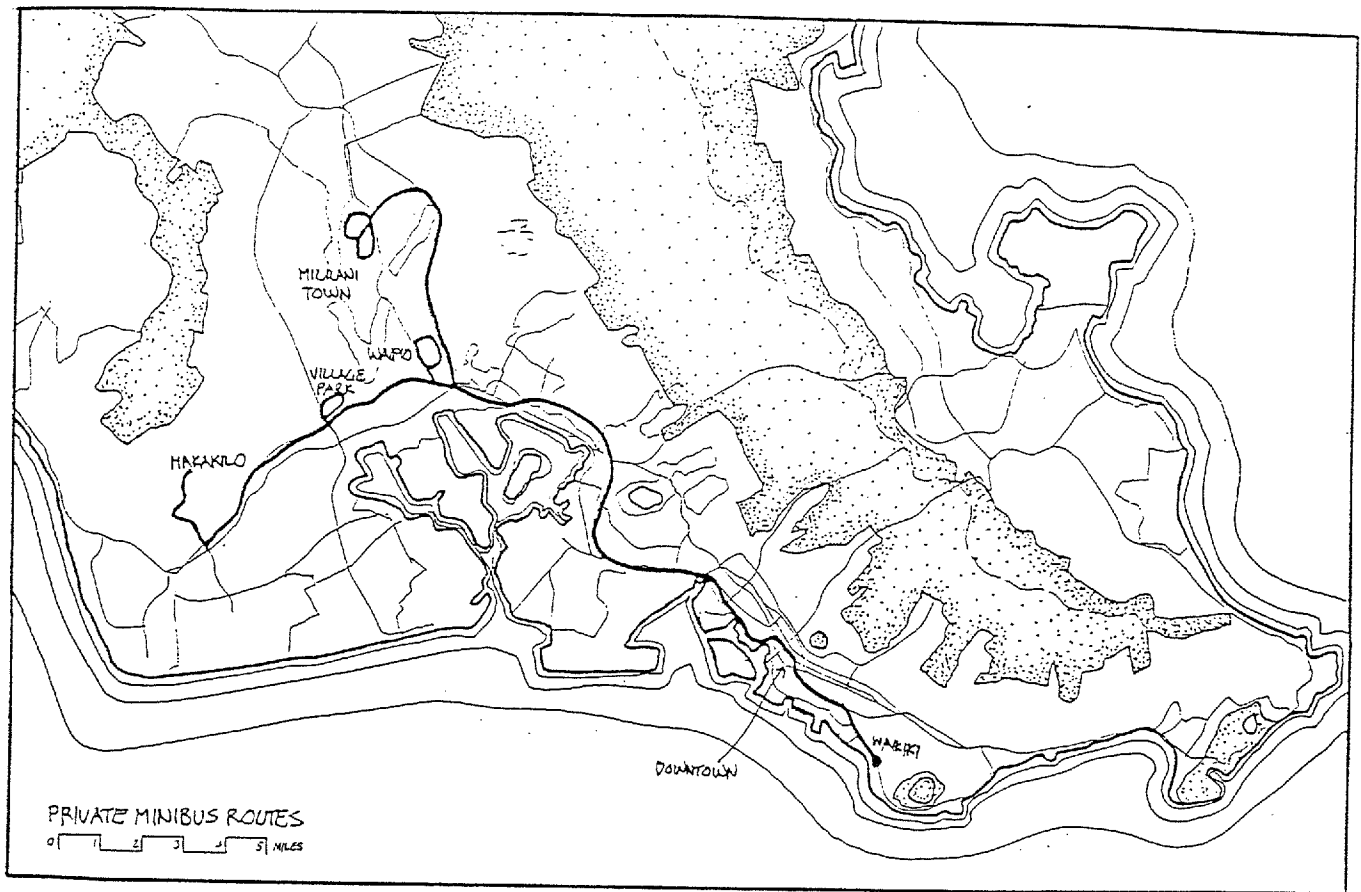


3.2.2 Implementation of a Para-Transit Program

This will include implementation of a privately-operated bus service from residential suburbs in Mililani and Ewa to downtown and Waikiki. The service could be provided by owner-operated, small buses which would spread their costs by carrying sightseeing tourists outside of commuting hours. The private buses would provide frequent peak-period service between residential suburbs and the central Honolulu area. This service would supplement the existing express bus services. See Map 2 for description of the proposed private bus routes.

Many alternative routes could be used for both the collection and distribution, however the line haul would be along the proposed continuous HOV system as shown in Maps 1-1 through 1-4.

Map 2 Proposed Private Bus Service



3.3 Rapid Transit - Coordinated Bus Alternatives

Rapid transit is being considered as a promising, capital intensive solution to the transportation needs of Central Honolulu and the Leeward corridor. Previous studies have determined that waterborne systems, light rail transit (LRT), personal rapid transit (PRT), and elevated busways are clearly inferior to rapid transit (see Alternatives Analysis Update, Task 4.1.1). However, growth in the intervening years and increased congestion in outer areas requires reconsideration of the length of a first priority rapid transit system. Also, due to evolution in rapid transit design techniques, many different rapid transit alignments, station locations, system "configurations", and implementation plans need to be considered.

3.3.1 First Rapid Transit Segment Definition

When earlier studies were developing rapid transit schemes, extreme traffic congestion was still only something predicted in forecasts. Although the eventual need for a line serving the entire corridor, and perhaps even crossing to the windward side was foreseen, proposals for a first operating phase were set mostly by what was considered affordable, and where a line could be most easily built.

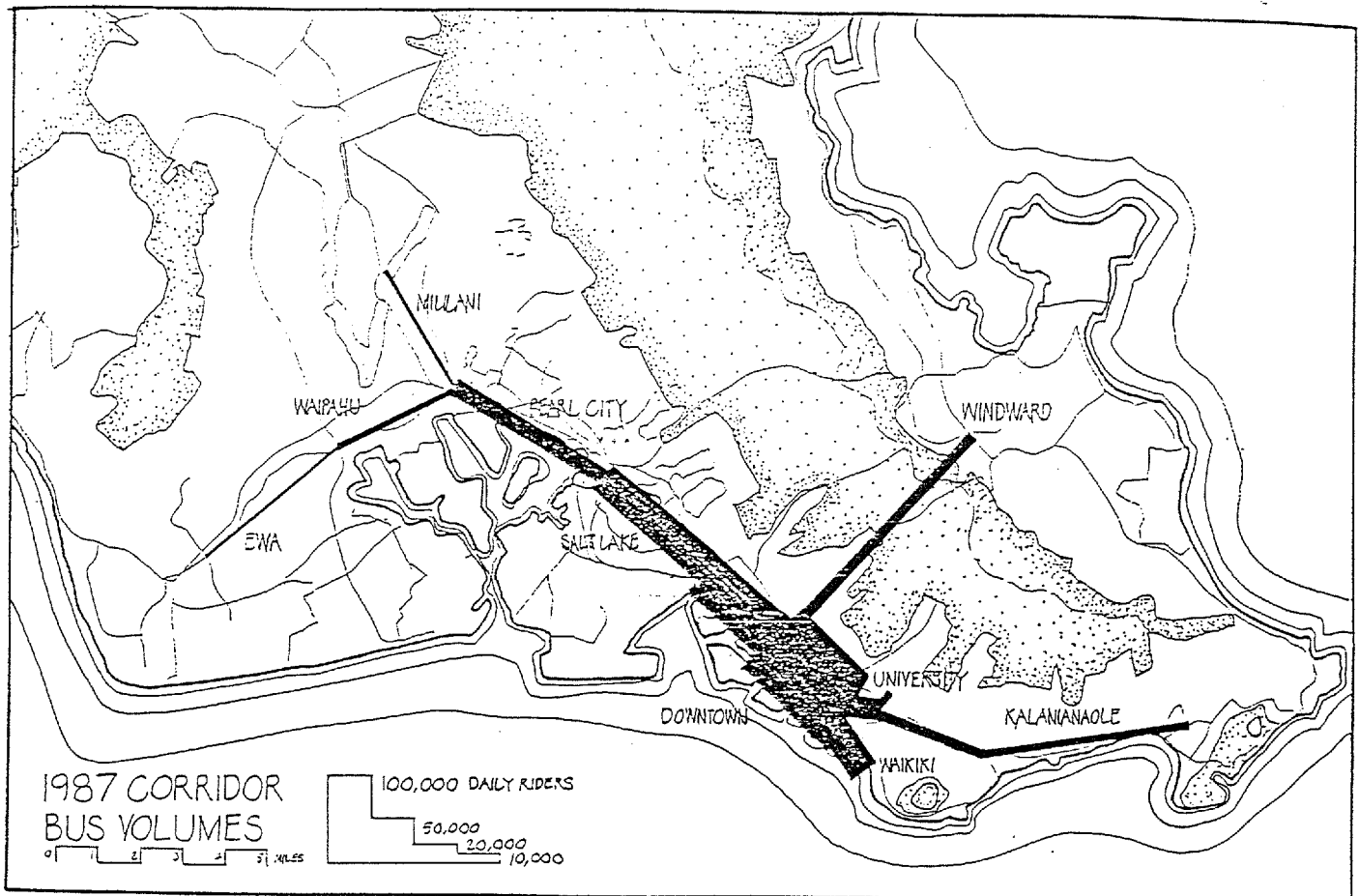
Now that extreme traffic congestion is a daily reality, the priority corridor for a first operating phase is much more readily apparent. This section defines a first priority rapid transit corridor based on two criteria, existing bus ridership, and revenue potential. For a more detailed evaluation, see the Alternatives Analysis Update (Task 4.1.1).

3.3.1.1 High Existing Bus Ridership

Rapid transit should first be considered where it might be justified by existing "corridor" bus ridership. "Corridor" bus ridership is those trips that might be better served by rapid transit, and do not include local and feeder services. Where bus ridership is already very high, rapid transit may actually cost less to operate than the buses it will replace, even if no new riders use transit. As shown in Map 3, there are already more than 20,000 riders per day from Pearl City to the University area. Between Middle Street and Ala Moana Center there are more than 50,000 riders per day, and through the Central Business District, existing ridership exceeds 100,000 per day.

Map 3

Existing Corridor Bus Ridership



Source: Origin-Destination survey of 11,000 bus riders conducted as part of the 1987 Short-Range Transit Plan Update for the Department of Transportation Services, City and County of Honolulu.

3.3.1.2 Revenue Potential

Rapid Transit should obviously be considered where tourist and resident traffic can pay a high proportion of incremental operating and capital costs, perhaps even generating a cash surplus that can be used to finance other portions of the system. Branches to Waikiki, the Airport, the Arizona Memorial, and University may meet this criteria.

Bus ridership from within Waikiki is already about 30,000, with many passengers paying cash fares. A short rapid transit branch at least as far as Fort DeRussy would be within walking distance of many residents and hotels. Tourists paying cash fares to ride the system could be a major source of revenue. A Waikiki branch would also allow buses from Diamond Head and Kapahulu to turn back before the congested Kalakaua/Kapiolani intersection. Extension of the branch along Kuhio all the way to Kapahulu should be considered, as it might permit substantial bus cost savings, as well as alleviating traffic within Waikiki.

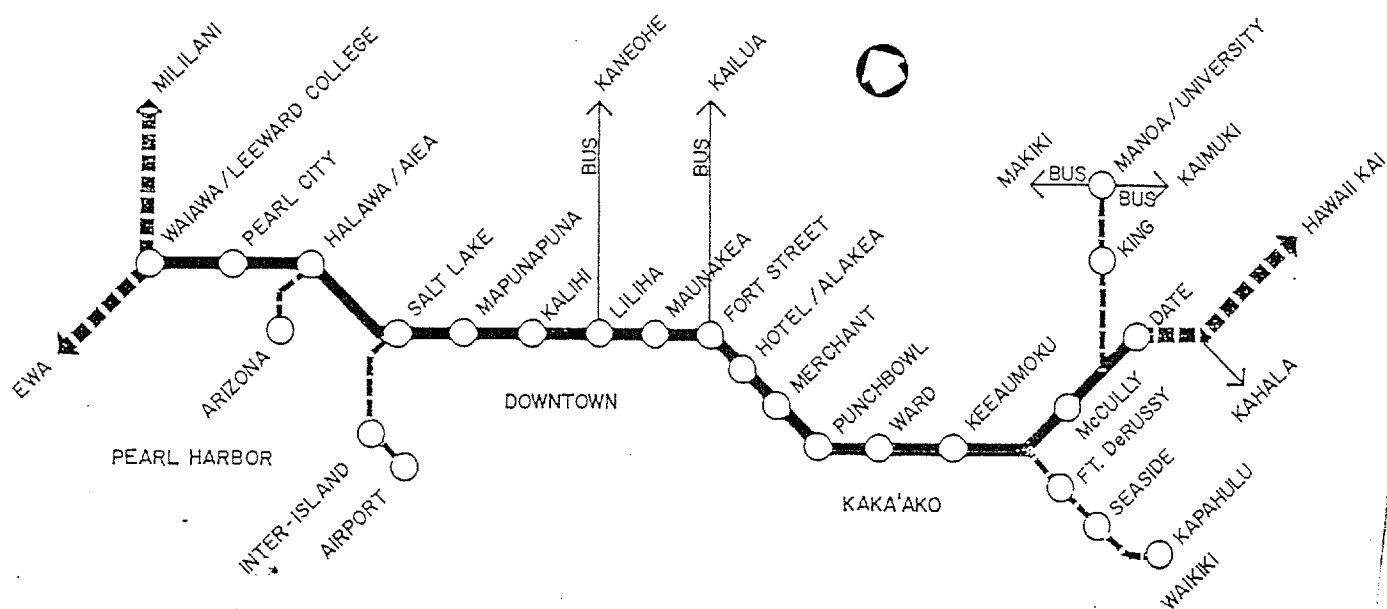
Although existing City bus ridership to the Airport is very low, this may be due to limited service and a prohibition on carrying large baggage. Given the large and concentrated traffic between Waikiki and the Airport, there may be significant potential for a revenue-generating branch line. Since tourists and local-based travellers otherwise face expensive parking or limousine charges, premium cash fare revenues might well generate a surplus.

Similarly, a branch line to the Arizona Memorial could carry primarily tourists paying cash fares, possibly generating a surplus.




A University branch, to Dole Street or even Maile Way, could serve several functions. First, the university campus and the Manoa valley already generate more than 7,000 riders per day. With more than 30,000 students and workers on the UH campus, and only 3,000 parking spaces, the potential rapid transit usage is very high. A short branch to Dole or Maile would bring the system within walking distance of the entire campus, offering a very attractive alternative to driving.

Map 4 shows a route schematic of a possible first priority rapid transit system. Detailed analysis of each segment of the corridor is presented in the Alternatives Analysis Update (Task 4.1.1).

Map 4 Conceptual Rapid Transit Route Schematic



This map indicates major locations rapid transit may serve. Various alignment and station location alternatives are being considered.

PROPOSED STAGE 1 MAIN LINE 
 POSSIBLE BRANCH LINES 
 POSSIBLE FUTURE EXTENSIONS 

3.3.2 Rapid Transit Alignment and Station Alternatives

Increased alignment and operating flexibility, smaller stations, and reduced environmental impacts associated with modern rapid transit technology allow consideration of many new rapid transit alignment alternatives. A detailed list of identified alignment and station location alternatives is presented in Appendix I, and described in Maps 5-1 through 5-8. Generally, the new choices are to:

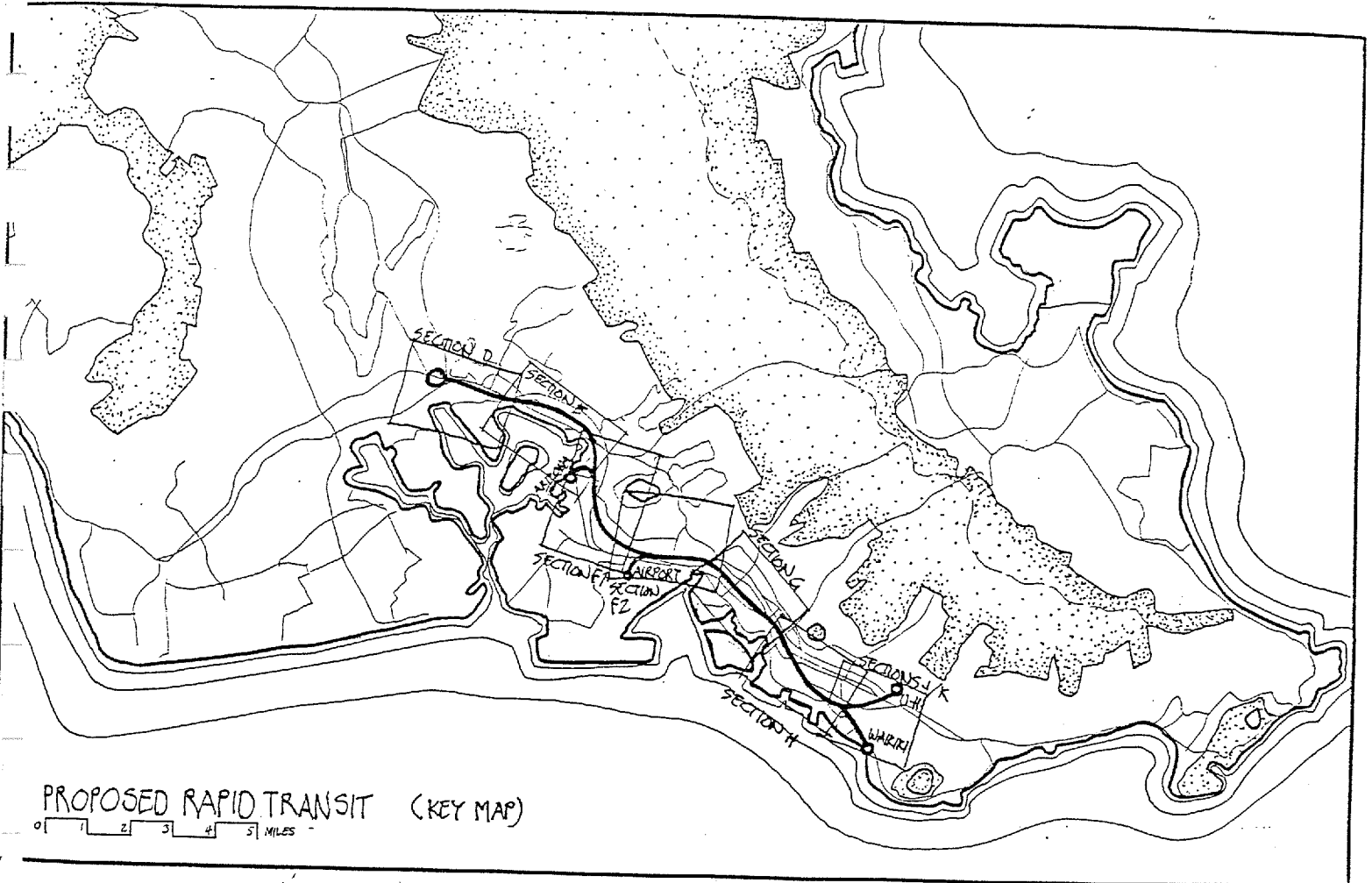
1. Follow more direct routes along the corridor. Kamehameha Highway and the Oahu Railway and Land Company right-of-way through Pearl City are shorter than following the Hali 2000 alignment along H-1. Similarly, Salt Lake Boulevard is approximately one mile shorter than H-1 by the airport, the HART alignment. King Street might be slightly shorter than Dillingham Boulevard through Kalihi, and could have stations located to better serve the community. Following Kapiolani Boulevard would be shorter and would avoid the need to take private property through Kaka'ako and Ala Moana;
2. "Thread" an elevated alignment through the downtown, avoiding sensitive buildings and parks, offering more stations and serving more areas than HART. Portions of numerous streets might be followed, including Beretania, Hotel, Queen, Alakea, Halekauwila, Nimitz, and Ala Moana Boulevard;
3. Provide short branch lines, with integrated service, to major off-line destinations including the Airport, University, Waikiki, and Pearl Harbor/Arizona Memorial;
4. Avoid taking of private property wherever possible, except where joint development agreements can be negotiated that benefit the public and defray system costs, or where alternative alignments are substantially more expensive or disruptive. Identification of potential joint-development sites will be made during conceptual engineering, and will depend on the willingness of developers to offer attractive terms;
5. Consider providing additional stations serving built-up areas, to the extent these may be justified by increased revenues and ridership, reduced feeder bus costs, and better service to communities;

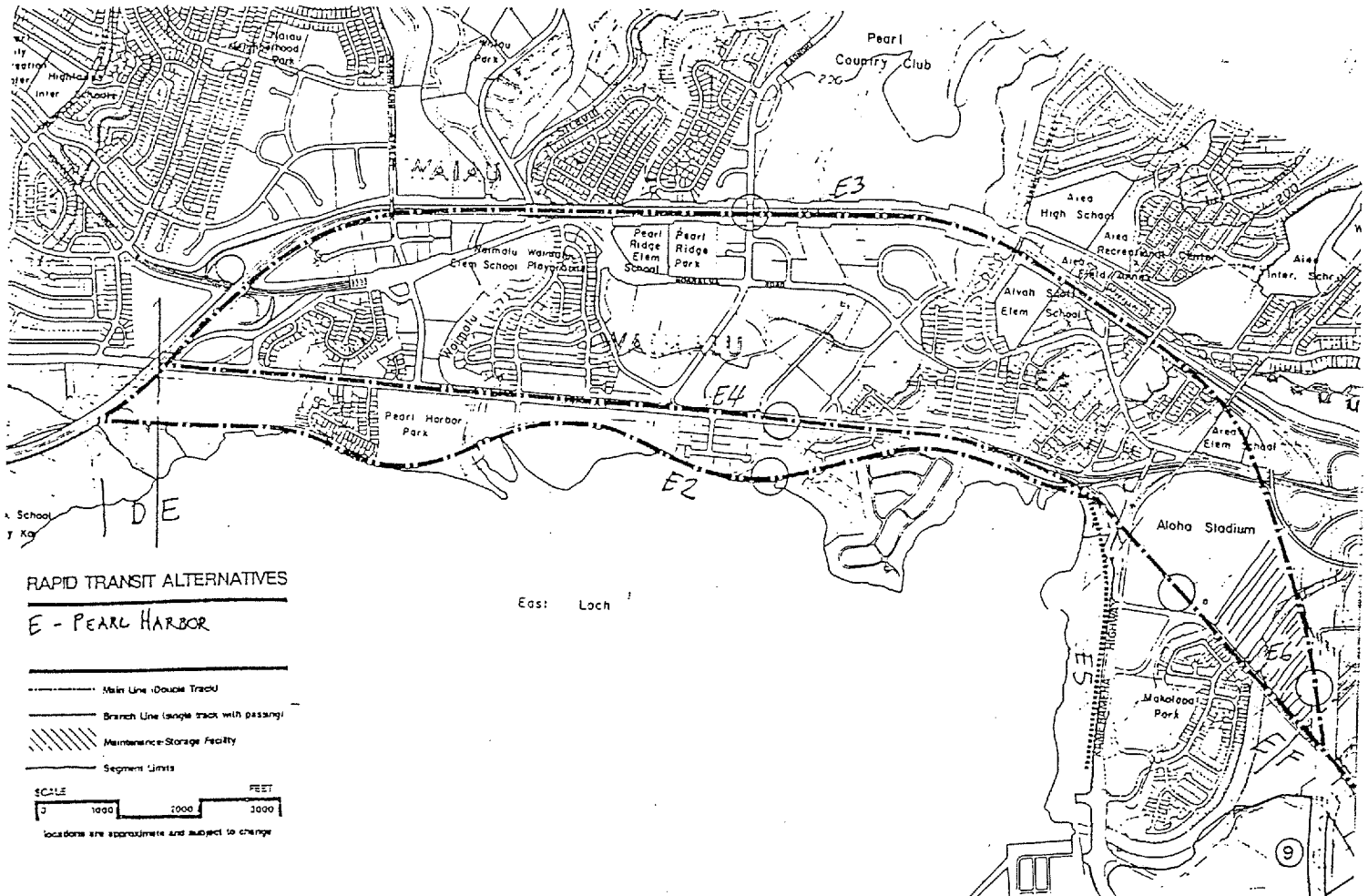
Additional variations may be identified in conceptual engineering, and where they offer significant advantages they will be considered and included in subsequent analysis.

Map 5-1

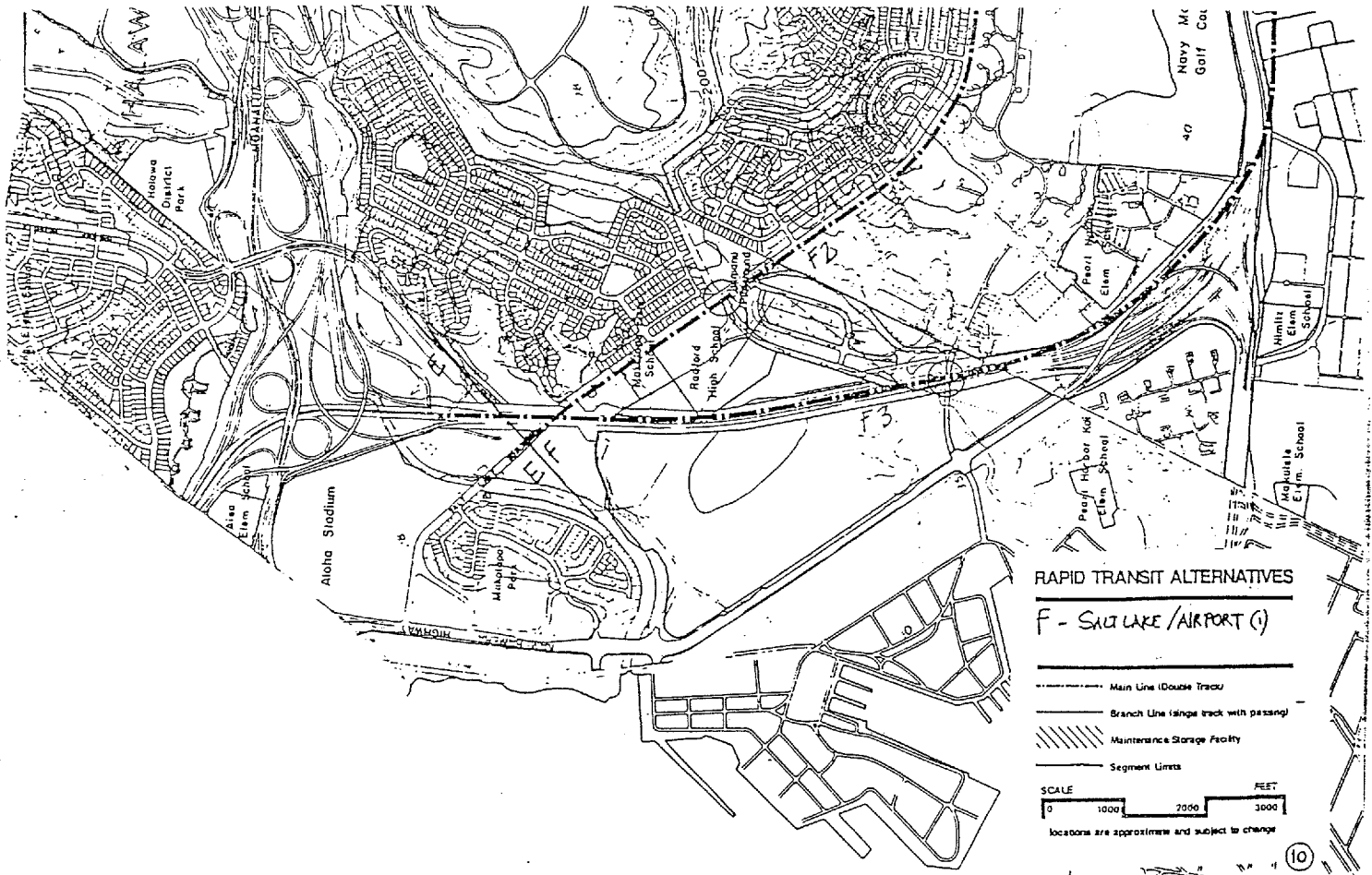
Rapid Transit Alignment and Station Alternatives

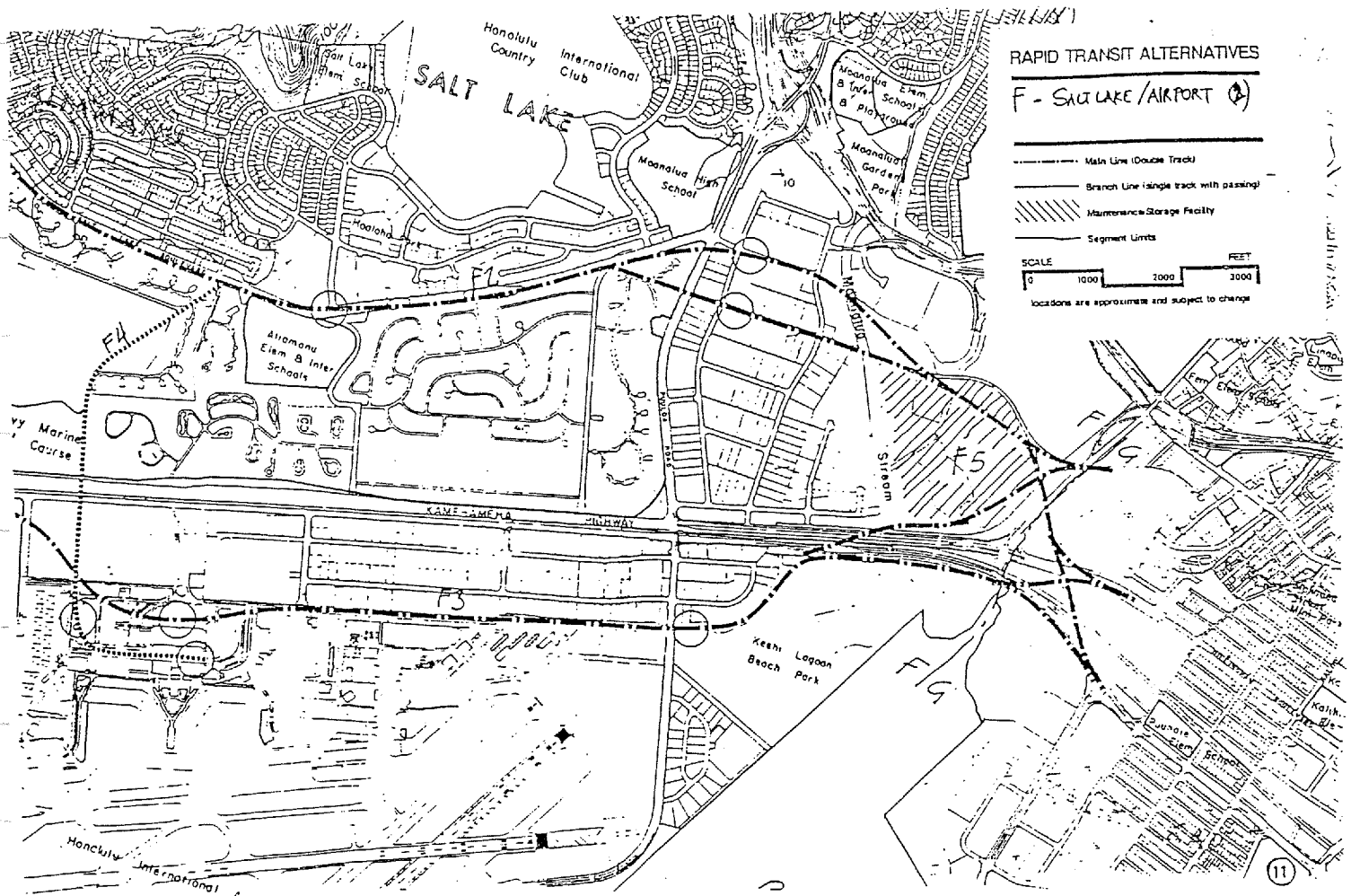
Key Map





Section F (1) - Salt Lake/Airport

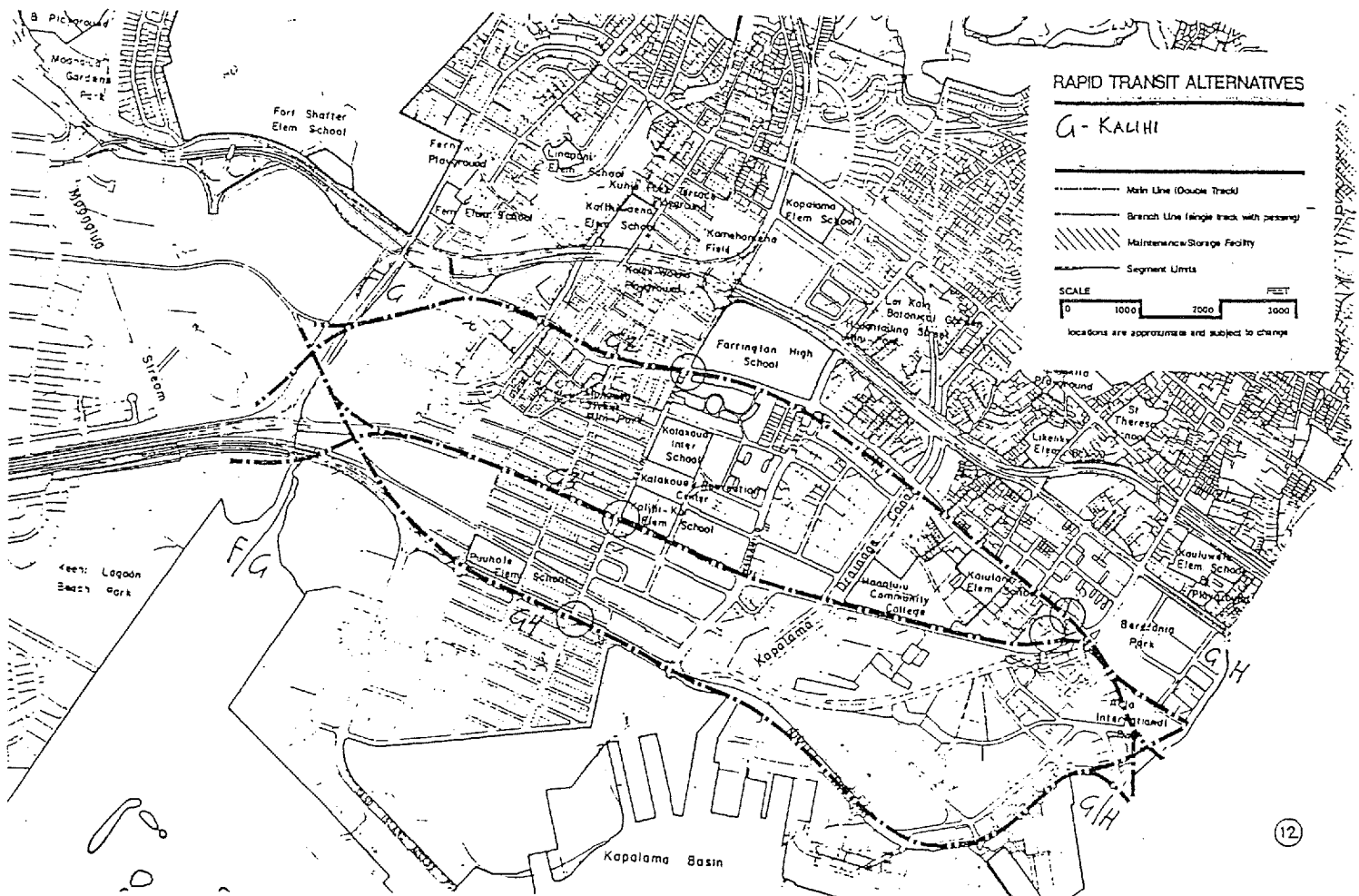




Rapid Transit Alignment and Station Alternatives

Section G - Kalihi

Section G - Kalihi



RAPID TRANSIT ALTERNATIVES

G - KALIH

Branch Line (single track with

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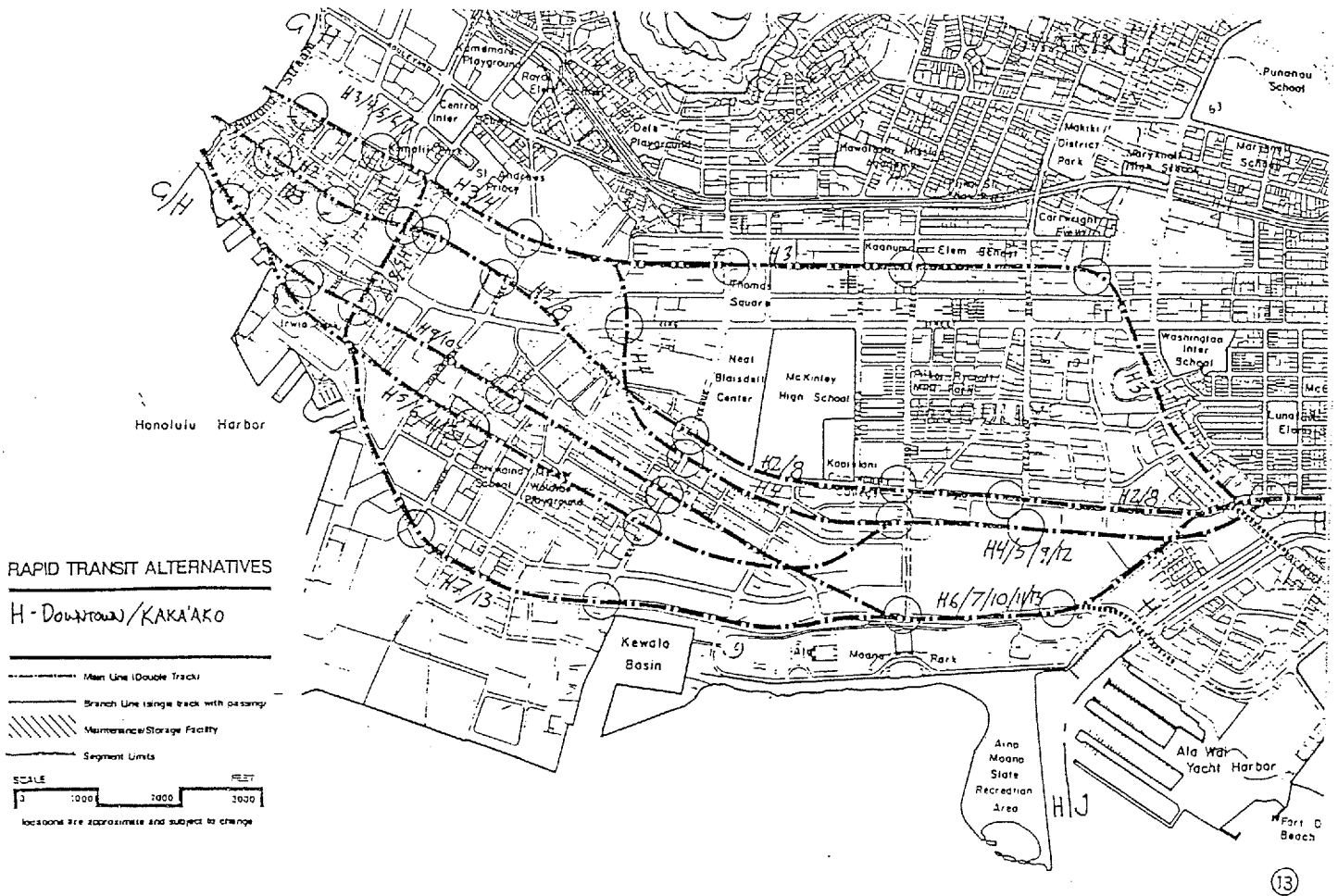
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locations are approximate and subject to change

Section H - Downtown/Kaka'ako



3.3.3 Coordinated Bus and Highway System Elements

The Rapid Transit-Coordinated Bus alternative will include all appropriate highway and bus system projects, as described for the "no-build" alternative.

Substantial changes in the nature of the bus system are anticipated, with many routes truncated at rapid transit stations, and service increased in outlying suburbs. Streets parallel to rapid transit will generally see the elimination of through bus service to downtown, but service will be maintained on virtually all existing routes for a feeder function and for short trips.

Beyond the rapid transit terminals, improved express service is anticipated to outer suburbs such as Hawaii Kai, Ewa, and Mililani. These services should complement rapid transit and extend its benefits throughout the corridor.

APPENDIX I

LIST OF RAPID TRANSIT ALIGNMENT AND STATION ALTERNATIVES

GENERAL NOTES

Rapid Transit alignments and station locations are generally elevated unless otherwise noted, but may be at-grade if feasible. Alignment locations are approximate, and may be along the center or side of named streets, or in adjacent property, or elsewhere within 150 feet. Station locations must of course be along an alignment, within 1,000 feet of the named location. Combinations of different alignments may be considered. Rapid Transit facilities may include provision for joint use, such as parking, commercial, residential, or parkland development.

SEGMENT, LIMITS, AND ALTERNATIVES

LOCATION (approximate)

Segments A, B, C are reserved
for future study.

Segment D - PEARL CITY - Waiawa to Waiaua(H-1/Kamehameha Overpass)

D2.	Rapid Transit	OR & L Right-of-way (to Navy)
D3.	Rapid Transit	H-1 freeway (to Navy)
D4.	Rapid Transit	Kamehameha Highway (to Navy)
D5.	Rapid Transit	H-1 freeway (to Waikele)
D6.	Rapid Transit	Old Kamehameha (to Waikele)
D7.	Rapid Transit Maintenance/Storage	Navy Barrel Site
D2/3/4-a	Rapid Transit Station	Navy Barrel Site
D5/6-a.	Rapid Transit Station	"Waikele" site
D2/3/4/5/6-b	Rapid Transit Station	Waimano Home Road (3 sites)

SEGMENT, LIMITS, AND
ALTERNATIVES

LOCATION (approximate)

Segment E - PEARL HARBOR - Waiiau to Halawa (Kahuapaani Street)

E2.	Rapid Transit	OR & L/Salt Lake Blvd
E3.	Rapid Transit	H-1 freeway
E4.	Rapid Transit	Kamehameha/Salt Lake Blvd
E5.	Rapid Transit Branch	OR & L to Arizona Memorial
E6.	Rapid Transit Maintenance/Storage	Aloha Stadium (south parking area)
E2/3/4-a.	Rapid Transit Station	Aiea/Pearlridge Shopping Center (3 sites)
E2/3/4-b.	Rapid Transit Station	Aloha Stadium (2 sites)
E5-a.	Rapid Transit Station	Arizona Memorial

F - SALT LAKE/AIRPORT - Aloha Stadium to Middle Street

F2.	Rapid Transit	Salt Lake Boulevard
F3.	Rapid Transit	H-1 freeway and Aolele Street (Airport) as in HART EIS
F4.	Rapid Transit Branch	Connecting Airport terminals with Salt Lake alignment
F5.	Rapid Transit Maintenance/Storage	Fort Shafter Flats
F2-a.	Rapid Transit Station	Bougainville/Radford H.S.
F3-a.	Rapid Transit Station	Radford Drive
F2-b.	Rapid Transit Station	Salt Lake/Ala Lilikoi
F3-b.	Rapid Transit Station	Airport (Parking Garage)
F4-a.	Rapid Transit Station	Inter-Island Terminal
F4-b.	Rapid Transit Station	International Terminal
F1-c.	Rapid Transit Station(6f)	Lagoon Drive as in HART EIS
F2-c.	Rapid Transit Station(6d)	Pukuloa/Mapunapuna
F2-d.	Rapid Transit Station(6d)	Makumoa/Mapunapuna

SEGMENT, LIMITS, AND
ALTERNATIVES

LOCATION (approximate)

G - KALIHI - Middle Street to River Street

G2.	Rapid Transit	King Street
G3.	Rapid Transit	Dillingham Boulevard
G4.	Rapid Transit	Nimitz Highway
G2/3/4-a.	Rapid Transit Station	Kalihi Street (3 sites)
G2/3-c.	Rapid Transit Station	Liliha St./Honolulu Community College (2 sites)

H - DOWNTOWN - River Street to McCully/Ala Wai

H2.	Rapid Transit	Hotel Street/Kapiolani Blvd (underground)
H3.	Rapid Transit	Beretania/Kalakaua/Kapiolani
H4.	Rapid Transit	Beretania/Alapai/Waimanu/Kona/Kapiolani
H5.	Rapid Transit	Beretania/Alakea/Halekauwila/Kona/Kapiolani
H6.	Rapid Transit	Beretania/Alakea/Halekauwila /Ala Moana/Atkinson/Kapiolani
H7.	Rapid Transit	Beretania/Alakea/Ala Moana/Atkinson/Kapiolani
H8.	Rapid Transit	Hotel/Kapiolani
H9.	Rapid Transit	Nimitz/Queen/Kona/Kapiolani
H10.	Rapid Transit	Nimitz/Queen/Ala Moana/Atkinson/Kapiolani
H11.	Rapid Transit	Nimitz/Halekauwila/Ala Moana/Atkinson/Kapiolani
H12.	Rapid Transit	Nimitz/Halekauwila/Kona/Kapiolani
H13.	Rapid Transit	Nimitz/Ala Moana/Atkinson/Kapiolani

SEGMENT, LIMITS, AND
ALTERNATIVES

LOCATION (approximate)

H3/4/5/6/7-a	Rapid Transit Station Maunakea/Beretania
H8-a	Rapid Transit Station Maunakea/Hotel
H9/10/11 /12/13-a	Rapid Transit Station Maunakea/Nimitz
H2-a	Rapid Transit Station Fort/Hotel (Underground)
H3/4/5/6/7-b	Rapid Transit Station Fort/Beretania
H8-b	Rapid Transit Station Fort/Hotel
H9/10-b	Rapid Transit Station Fort/Queen
H11/12/13-b	Rapid Transit Station Fort/Nimitz
H5/6/7-c	Rapid Transit Station Hotel/Alakea
H8-c	Rapid Transit Station Hotel/Richards
H5/6/7-d	Rapid Transit Station Queen/Alakea
H9/10-c	Rapid Transit Station Richards/Queen
H2-b	Rapid Transit Station Punchbowl/Hotel
H3/4-c	Rapid Transit Station Punchbowl/Beretania
H5/6/11/12-e	Rapid Transit Station Halekauwila/South St.
H7/13-e	Rapid Transit Station Ala Moana/South St.
H8-d	Rapid Transit Station Hotel/Punchbowl
H9/10-d	Rapid Transit Station Queen/South St.
H4-d	Rapid Transit Station King/Cooke
H2-c	Rapid Transit Station Ward/Kapiolani (underground)
H3-d	Rapid Transit Station Ward/Beretania
H4-e	Rapid Transit Station Ward/Waimanu
H5/6/11/12-f	Rapid Transit Station Ward/Halekauwila

SEGMENT, LIMITS, AND
ALTERNATIVES

LOCATION (approximate)

H7/13-f	Rapid Transit Station Ward/Ala Moana
H8-e	Rapid Transit Station Ward/Kapiolani
H9/10-e	Rapid Transit Station Ward/Queen
H3-e	Rapid Transit Station Piikoi/Beretania
H4/5/9/12-g	Rapid Transit Station Piikoi/Kona
H6/7/10 11/13-g	Rapid Transit Station Piikoi/Ala Moana
H8-f	Rapid Transit Station Kapiolani/Piikoi
H2-d	Rapid Transit Station Keeaumoku/Kapiolani (underground)
H3-f	Rapid Transit Station Kalakaua/Beretania
H4/5/9/12-h	Rapid Transit Station Keeaumoku/Kona
H6/7/10 /11/13-h	Rapid Transit Station Ala Moana/Atkinson
H8-g	Rapid Transit Station Keeaumoku/Kapiolani
H2-e	Rapid Transit Station Kalakaua/Kapiolani (underground)
H3 to H13-j	Rapid Transit Station Kalakaua/Kapiolani
<u>J - WAIKIKI - Atkinson/Kapiolani into Waikiki</u>	
J2	Rapid Transit branch Ala Moana Blvd from Atkinson to Ft. DeRussy (possibly single track)
J3	Rapid Transit branch Kalakaua from Kapiolani to Ft. DeRussy (possibly single track)
J4	Rapid Transit branch Kuhio from Ft. DeRussy to Zoo (possibly single track)

SEGMENT, LIMITS, AND
ALTERNATIVES

LOCATION (approximate)

J2-a	Rapid Transit Station	Hobron/Ala Moana
J3-a	Rapid Transit Station	Ena/Kalakaua
J2/3/4-b	Rapid Transit Station	Fort DeRussy
J4-c	Rapid Transit Station	Kalaimoku/Kuhio
J4-d	Rapid Transit Station	Seaside/Kuhio
J4-e	Rapid Transit Station	Kaiulani/Kuhio
J4-f	Rapid Transit Station	Paoakalani/Kuhio
J4-g	Rapid Transit Station	Kapahulu/Ala Wai
<u>K - UNIVERSITY - McCully to Kapahulu</u>		
K2	Rapid Transit	Kapiolani Boulevard to Date
K3	Rapid Transit	Kapiolani/University/Old Waialae (HART alignment)
K4	Rapid Transit	Kapiolani/University to King
K5	Rapid Transit Branch	University Kapiolani to Dole (possibly single track)
K6	Rapid Transit Branch	University Dole to Maile (possibly single track)
K2-a	Rapid Transit Station	Kapiolani/Date
K3/4-a	Rapid Transit Station	University/Date
K3/4/5-b	Rapid Transit Station	King/University
K3-c	Rapid Transit Station	Old Stadium(HART Terminal)
K5-c	Rapid Transit Station	Dole/University
K6-a	Rapid Transit Station	Maile/University

APPENDIX II

LIST OF PREVIOUS RELATED REPORTS

PREPARED BEFORE PEEP I

1. Oahu Transportation Study (4 volumes), 1967

REPORTS PREPARED FOR PEEP I

1. Airport-Waikiki Transfer Study, March 1972
2. Preliminary Engineering Evaluation Program Costs and Benefits, April 27, 1972
3. Development of Rapid Transit System Criteria for Route Selection, Draft, November 1971
4. Development of Rapid Transit System Objectives & Criteria Draft, October 5, 1971
5. Draft Environmental Impact Statement, September 1972, Volumes 1, 2 and 3
6. Environmental Impact Statement for Honolulu Rapid Transit System, Summary, September 1972
7. Environmental Impact Statement for Honolulu Rapid Transit Project Summary - Prepared by City Staff, October 1972
8. Environmental Impact Statement - Response to Comments of the Marine Affairs Coordinator, January 2, 1973
9. Outline of Draft Environmental Impact Statement, May 19, 1972
10. Draft Final Report, Summary, November 22, 1972
11. Draft Final Report, Honolulu Rapid Transit Project, November 1972
12. Final Report, December 1972
13. Final Report, Summary, December 1972
14. Economic Impact Study, Transit Stations Areas, December 1972
15. Evaluation of Organizational Alternatives for the Honolulu Bus and Rapid Transit System, November 1972

16. Evaluation of Transit Concepts and Vehicles, December 1971
17. Fact Kit - Briefing Session on PEEP, August 26, 1971
18. Financial Plan for a Honolulu Rapid Transit System, November 1972
19. Financial Resources Study Interim Report, Draft, February 1972
20. Financial Resources Study Interim, Report, February 1972
21. Goals and Objectives, October 1971
22. Land Use Impact Study, Interim Report, September 1972 (this report contained in Volume 3 of the EIS)
23. Long Range Regional Transit Plan, March 1972
24. Long Range Regional Transit Plan Development (Draft), December 1971
25. Memorandum on Survey of Construction Conditions on Oahu, Draft, December 1971
26. Monorail Systems Analysis (Supplement to Interim Report on Evaluation of Transit Concepts & Vehicles, February 1972)
27. Patronage, Revenues & Operation Final Report, September 1972
28. Patronage Study Interim Report, March 1972
29. Preliminary Implementation Schedule, June 1972
30. Preliminary Investigation of Subway Construction, Draft of Interim Report, December 1971
31. Preliminary Market Study - Demand for Land Uses in Areas Spanned by Proposed Rapid Transit System 1980; 1995 - June 1, 1972
32. Preliminary Notes on Relocation, December 1971
33. Preliminary Report on the Comparison of Pollution Emissions by Mode of Travel, March 29, 1972
34. Preliminary Report on the Comparison of Pollution Emissions by Mode of Travel, May 22, 1972
35. Preliminary Report on Fares & Fare Collection Systems, December 1971

36. Preliminary Report on Potential Use of Transit for Air Cargo and Air Mail Hauling, October 5, 1971
37. Preliminary Report on Relocation, June 8, 1972
38. Preliminary Report on Social Impact Investigations Child Care, Elderly, Handicapped, June 15, 1972
39. Preliminary Engineering Evaluation Program - Public Information Program Planning Work Element 9, July 21, 1971
40. Progress Report on Geologic and Soils Engineering Services, January 1972
41. Public Information Program, October 5, 1971
42. Rapid Transit Preliminary Engineering & Evaluation Program Work Program and Schedule, July 30, 1971
43. Report on Alternate Route Potentials Through Downtown, Chinatown and the Civic Center, September 1971
44. A Review of Special Transit Benefit District, December 1972
45. A Review of Taxes on Motor Vehicles in the U. S., December 1972
46. Route Alternatives, Honolulu Rapid Transit System
47. Route Planning Study, Volumes 1, 2 and 3, March 1972
48. Social Impact, August 1972
49. Social Impact, December 1972, Interim Report
50. Summary - Long Range Regional Transit Plan & Phasing
Preliminary Patronage Estimates
Route Planning Activities
Public Information Hearings
March 1972
51. Transit Concepts, An Interim Report, December 3, 1971
52. Preliminary Report on Air Passenger Patronage for Alternative Transit Systems, October 1971

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1. Feasibility Study of the H-1 Freeway Route for Fixed Guideway System (Pearl City to Middle Street), March 1974 Interim Report, DMJM

2. Feasibility Study of the H-1 Freeway System for Fixed Guideway System, Technical Report, March 1974, DMJM
3. Feasibility Study of the Lunalilo Freeway Route for Fixed Guideway System (Kapiolani Interchange to Kalaniana'ole Highway), March 1974, Interim Report, DMJM
4. Feasibility Study of the Lunalilo Freeway Route for Fixed Guideway System, Technical Report, March 1974, DMJM
5. Evaluation of the Off-Line Station Concept, Interim Report, April 1974, DMJM
6. Study of Alternative Alignments in the Dillingham Boulevard Corridor, April 1974 (From Middle Street to North King Street), DMJM
7. Study of Alternative Alignment in the Dillingham Boulevard Corridor, Technical Report, April 1974 (From Middle Street to North King Street), DMJM
8. Study of Alternative Routes in the Three M/University Area from Kalakaua Avenue to Kapiolani Interchange (Draft Interim Report, May 1974)
9. Study of Alternative Routes in the Moiliili/University Area, Technical Report, May 1974, DMJM (From McCully Street to Kapiolani Interchange)
10. Provisions for the Elderly and Handicapped for Fixed Guideway System, Interim Report, May 1974, DMJM
- 10A. Provisions for the Elderly and Handicapped for Fixed Guideway System, Technical Report, May 1974, DMJM
11. Alternative Methods of Transit Service to Selected Activity Centers, Interim Report, June 1974, Draft
12. HIA-Waikiki Transfer Service (Preliminary Draft) July 1974
13. ODC Urban Design Report (Draft), May 1974
14. Landscape Criteria for Honolulu Rapid Transit System, Pearl City to Hawaii Kai, Iwamoto and Associates, October 1974
15. Rapid Transit Preliminary Engineering Evaluation Program Car Storage and Maintenance Yard, Honolulu, Oahu, Hawaii TMK: 1-2-19 and 1-2-23 Soil Reconnaissance Report, October 1974, Walter Lum Associates.
16. Preliminary Subsurface Investigation Proposed Honolulu Rapid Transit System Underground Section for City and County of Honolulu, September 1974, Dames

17. City and County of Honolulu, Rapid Transit Preliminary Engineering Evaluation Program, Phase II (HI-09-0005), Interim Summary Report, November 1974
18. City and County of Honolulu, Rapid Transit Preliminary Engineering Evaluation Program, Phase II (PEEP II), Interim Summary, December 1974
19. Technical Report Study of Rubber-Tired Transit Technology, Honolulu Rapid Transit Project, Phase II, December 1974
20. Patronage and Revenue Estimates, A. M. Voorhees & Associates, Inc., November 1974, Technical Report
21. Draft Final Report, Phase II, February 1975, DMJM
Draft Final Report, Phase II, October 1976, DMJM
22. ODC Summary Reports, 1A - 1G, 3, 4, 5
23. General Obligation Rapid Transit Bonding Program for the City and County of Honolulu, Smith Barney and Company, February 1975 (Letter Report)
24. Draft, Urban Design Study of Selected Station Areas, March 1975, Technical Memorandum
25. Study of Fixed Guideway Operational Concepts Technical Report, July 1974, DMJM
26. Technical Memo - Benefit Cost Analysis, March 1975, Draft
27. Preliminary Investigation of Structures Adjacent to Underground Segment, January 1975, Draft
28. Preliminary Investigation of Structures Adjacent to Underground Segment, Final, January 1975, Technical Memorandum, DMJM
29. Provisions for the Elderly and Handicapped for Fixed Guideway System, May 1974, Technical Report
30. Manual of Recommended Policies for the Construction and Operation of the Rapid Transit System, March 1975, Technical Memorandum, DMJM
31. Short-Range Bus Plan for Oahu FY 1975-80, Interim Technical Report, February 1975
32. Interim Report on Management Plan Task A - Organization Structure, May 1975, Gottfried Consultants, Inc.
33. Engineering Design Criteria, Volumes I, II, III, IV, DMJM, May 1975, Technical Document

34. Summary - Honolulu Rapid Transit System PEEP Phase II, June 1975
35. Relocation Plan (Draft), May 1975
36. General Plan Amendment (Draft of Portions), June 1975
37. Alternative Transit Concepts Analysis, Honolulu Rapid Transit Project, PEEP, Phase II, July 1975, DMJM
38. Relocation Plan Summary, June 1975, Survey Marketing Services, Inc.
39. Relocation Plan, Final Report, June 1975
40. Honolulu Rapid Transit Relocation Plan - Supplemental Report on Ala Wai Manor, September 1975, Survey Marketing Services, Inc.
41. Preliminary Investigation of Structures Adjacent to Underground Segment, January 1975
42. Supplement to Alternative Transit Concepts, August 1975, DMJM
43. Supplement to the Analysis of Alternative System Lengths, August 1975, DMJM
44. Summary Report on Transit Planning & System Development Alternatives, September 1975, DMJM
45. Report on Management Plan (Draft), July 1975, Gottfried Consultants, Inc.
46. Report on Management Plan (Final), September 1975, Gottfried Consultants, Inc.
47. Supplement to Report on Management Plan, by Staffs of Managing Director's Office, Department of Transportation Services & Chief Budget Officer, June 1977
48. Bus Shelters and Bus Information Centers, June 1975, Clarence Lee Design, Inc.
49. Benefit Cost Analysis, Honolulu Rapid Transit Project, Phase II, Technical Memorandum, March 1975, Prepared by Environmental Capital Managers, Inc.
50. Manual of Recommended Policies for the Construction and Operation of the Rapid Transit System, March 1975, DMJM
51. Financing the Honolulu Transit Program (Draft)

52. Financing the Honolulu Rapid Transit Program, Department of Transportation Services, City and County of Honolulu, July 1975, Final Report, Smith Barney
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54. Urban Design Study of Station Areas, March 1975
55. Summary Report on Rapid Transit General Plan Amendment Application, Draft, March 11, 1976, Donald Wolbrink & Associates
56. Analysis of Transit Alternatives, Honolulu Rapid Transit Project, Phase II, DMJM
57. Additional Technical Information for Alternative Analysis
58. Evaluation of Supplementary Waterborne System, Work Element XIV (See No. 62)
59. Short Range Bus Plan for FY 1976-81, Technical Report, December 1975
60. Summary Report Preliminary Value Capture Analysis, July 1976, Honolulu Rapid Transit Project, Department of Transportation Services, City & County of Honolulu, DMJM
61. Evaluation of Supplementary Waterborne System, City & County of Honolulu, Honolulu Rapid Transit Project, PEEP II, Work Element XIV, July 1976, AMV & PBQD
62. Draft Honolulu Rapid Transit System Environmental Impact Analysis, February 1976
63. Draft Final Report, October 1976
64. Final Report, Honolulu Rapid Transit System, Preliminary Engineering & Evaluation Program Phase II, November 1976, DMJM
65. Honolulu Rapid Transit System, Preliminary Engineering & Evaluation Program, Phase II, Summary Report, December 1976, Prepared for Department of Transportation Services, City and County of Honolulu (Draft)
66. Preliminary Value Capture Analysis for Proposed Fixed-Guideway Rapid Transit System, City and County of Honolulu, February 1978, Ross, Hardies, O'Keefe, Babcock & Parsons; Rice Center for Community Design + Research; Robert J. Harmon & Associates, Inc.

67. Bus Transit Alternative for Oahu, March 21, 1978, Draft, Department of Transportation Services, City & County of Honolulu
68. Constitutional Provisions Supporting Joint Development/ Value Capture Mechanisms For Financing Public Improvements, Ross, Hardies, O'Keefe, Babcock & Parsons (David L. Callies, Susan G. Lichtenfeld, June 9, 1978)
69. Honolulu Rapid Transit System Update of the PEEP II Relocation Plan: Private Housing Market Data, December 1977, Survey & Marketing Services, Inc.

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1. Evaluation of Alternative Segment Length For Initial Construction, March 1978, DMJM
2. Study of the King-Beretania Corridor Alignment, March 1978, DMJM
3. Study of the Makai Alignment, March 1978, DMJM
4. Study of the Salt Lake Boulevard Alignment, March 1978, DMJM
5. Traffic Impact Study of the H-1 Freeway Alignment, March 1978, DMJM
6. Transit Patronage Forecast Sensitivity Analysis, June 1978, DMJM
7. Comparative Evaluation of Vehicle Systems, September 1978, DMJM
8. HART Historic Sites Survey, Volume I, December 1978, Charles Sutton & Associates
9. HART Historic Sites Survey, Volume II, December 1978, Charles Sutton & Associates
10. Waiialae Avenue Subway Study, January 1979, Parsons Brinckerhoff Quade & Douglas
11. Boring Exploration on Waiialae Avenue, January 1979, Walter Lum & Associates
12. Draft EIS-HART Project, July 1979

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13. Land Use Study Around Rapid Transit Stations, May 1980, Belt, Collins & Associates

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14. Proposed Financial Program for the Honolulu Bus/Rail Transportation System, February 1980, Ernst & Whinney

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15. Proposed Financial Program for the Honolulu Bus/Rail Transportation System, February 1981, Ernst & Whinney
16. Comments and Responses on the Draft Environmental Impact Statement, April 1982
17. Final Environmental Impact Statement, April 1982

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1. An Assessment of Two Mass Transit Alternatives for Honolulu, Prepared for Mrs. Marilyn Bornhorst, Chairman, City Council, Arthur Young and Company, April 1977
2. Transcript of the Seminar on Urban Mass Transit, Sponsored by the Office of the Legislative Auditor, State of Hawaii, January 1978
3. The Future of Transit in Honolulu, John Hirten and Associates, December 1981
4. General Plan Objectives and Policies, City and County of Honolulu, December 1982
5. Kaka'ako Community Development District Plan, State of Hawaii Community Development Authority, February 1982
6. Fare Sample Survey, Technical Report, Department of Transportation Services, November 1983
7. The OMPO Travel Demand Models, Draft Report, December 1983
8. Hali 2000 Alternatives Analysis Study for the Oahu Long Range Transportation Plan Update, June 1984
9. Population and Economic Projections for the State of Hawaii 1980 - 2005, Department of Planning and Economic Development, July 1984

10. A Study of Technical Aspects of the Impacts of Residential Development on Highway Corridors on Oahu, Darby and Associates for Department of General Planning, June 1985
11. State of Hawaii Data Book, State Department of Planning and Economic Development
12. Short Range Transit Plan Update Fiscal Year 1986, Technical Report, December 1985
13. Summary Comparisons of HALI 2000 and HART Study Analyses of a Transit Guideway System, Letter Report to Gordon Lum, OMPO Executive Director, from Wilbur Smith and Associates, February 26, 1985
14. Residential Development Implications of the Development Plans, Department of General Planning, August 1985
15. Effects of Central and Leeward Oahu Developments Upon the State Highway System, State of Hawaii Department of Transportation Design Branch, March 1986
16. Short-Range Transit Plan Update Fiscal Year 1987, Technical Report (Draft), Department of Transportation Services January 1987

Conceptual Engineering Working Papers

1. Task 2.1.3 - Final Work Plan
2. Task 2.3.1 - Public Involvement Methodology
3. Task 2.3.2 - Scoping Meeting Summary Report
4. Task 3.1.1 - Supplier Development Methodology
5. Task 4.1.1 - Alternatives Analysis Update
6. Task 4.1.2 - Alignment Alternatives Evaluation Methodology
7. Task 4.3.1 - Corridor Development Methodology
8. Task 5.2 - Station Alternatives Walk-In Ridership Methodology
9. Task 6.1 - Overall Impacts Methodology